

# COMMUNICATIONS SETUP GUIDE



®

## CR6-RF451

11/16



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## General

- Prior to performing site or installation work, obtain required approvals and permits. Comply with all governing structure-height regulations, such as those of the FAA in the USA.
- Use only qualified personnel for installation, use, and maintenance of tripods and towers, and any attachments to tripods and towers. The use of licensed and qualified contractors is highly recommended.
- Read all applicable instructions carefully and understand procedures thoroughly before beginning work.
- Wear a **hardhat** and **eye protection**, and take **other appropriate safety precautions** while working on or around tripods and towers.
- **Do not climb** tripods or towers at any time, and prohibit climbing by other persons. Take reasonable precautions to secure tripod and tower sites from trespassers.
- Use only manufacturer recommended parts, materials, and tools.

## Utility and Electrical

- **You can be killed** or sustain serious bodily injury if the tripod, tower, or attachments you are installing, constructing, using, or maintaining, or a tool, stake, or anchor, come in **contact with overhead or underground utility lines**.
- Maintain a distance of at least one-and-one-half times structure height, 20 feet, or the distance required by applicable law, **whichever is greater**, between overhead utility lines and the structure (tripod, tower, attachments, or tools).
- Prior to performing site or installation work, inform all utility companies and have all underground utilities marked.
- Comply with all electrical codes. Electrical equipment and related grounding devices should be installed by a licensed and qualified electrician.

## Elevated Work and Weather

- Exercise extreme caution when performing elevated work.
- Use appropriate equipment and safety practices.
- During installation and maintenance, keep tower and tripod sites clear of un-trained or non-essential personnel. Take precautions to prevent elevated tools and objects from dropping.
- Do not perform any work in inclement weather, including wind, rain, snow, lightning, etc.

## Maintenance

- Periodically (at least yearly) check for wear and damage, including corrosion, stress cracks, frayed cables, loose cable clamps, cable tightness, etc. and take necessary corrective actions.
- Periodically (at least yearly) check electrical ground connections.

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# CR6-RF451

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## 1. Introduction

The CR6-RF451 contains a 900 MHz license-free radio specifically designed to work with Campbell Scientific equipment. It can be used with an RF451 at a base computer to establish communication between *LoggerNet* and the CR6-RF451. A CR6-RF451 can also be part of a new or existing RF450/RF451 network. (Note that the CR6-RF451 cannot be added to an RF401A-series or RF407-series network.)

This document describes how to set up a simple base RF451 to remote CR6-RF451 network. It also describes how to extend that system to include more slave CR6-RF451s and / or a slave/repeater CR6-RF451, and how the CR6-RF451 can be used in combination with other communication methods.

The CR6-RF451 contains the same radio as the standalone RF451. Most of the RF hardware settings are the same for the CR6-RF451 and the RF451. See the [RF451 manual](#) for more information on RF communication using the CR6-RF451.

## 2. Communication Setup

### 2.1 Basic Procedure: PC with RF451 to CR6-RF451

**NOTE** This procedure assumes the RF451 and the CR6-RF451 are in their Factory Default settings.

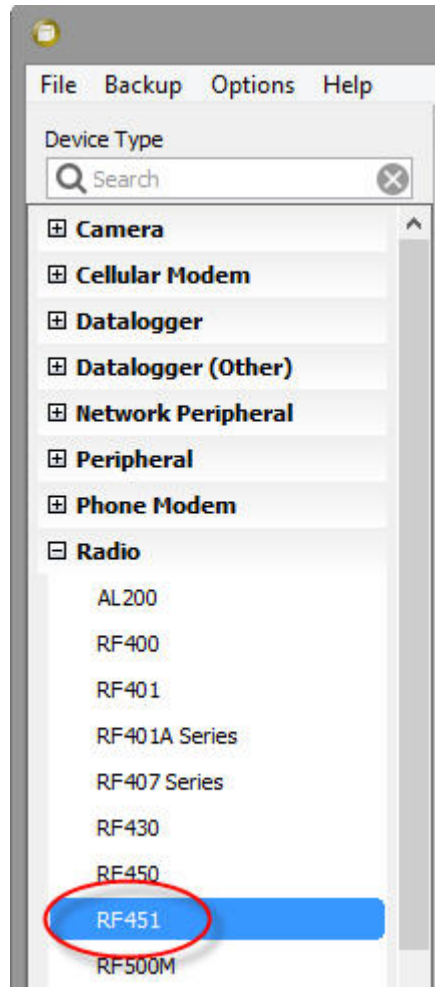
Click the *Device Configuration Utility* icon on the PC.



*Device Configuration Utility* (*DevConfig*) opens.

In *DevConfig*, select **Device Type** | **Radio** | **RF451**.

*DevConfig* displays **RF451** information in the right pane.



On the right pane, click the **Install the USB device driver** link.

The *Device Driver Installation Wizard* opens.

RF451
Send OS

## RF451

The RF451 is a high performance frequency hopping spread spectrum communication. It may be connected to a datalogger, computer, or any purpose of computer-to-datalogger and datalogger-to-datalogger comm



### Connect Instructions


**Note:** [Install the USB device driver](#) before connecting this product t

1. Connect the device **USB port** to your computer using the supplied
2. Select the correct **Communication Port** in the left panel. Not Communication Port to become available for use after physically
3. Select the **Connect** button.

Click **Next**.

The device drivers are installed and the Wizard advances to the next screen.

### Device Driver Installation Wizard



## Welcome to the Device Driver Installation Wizard!

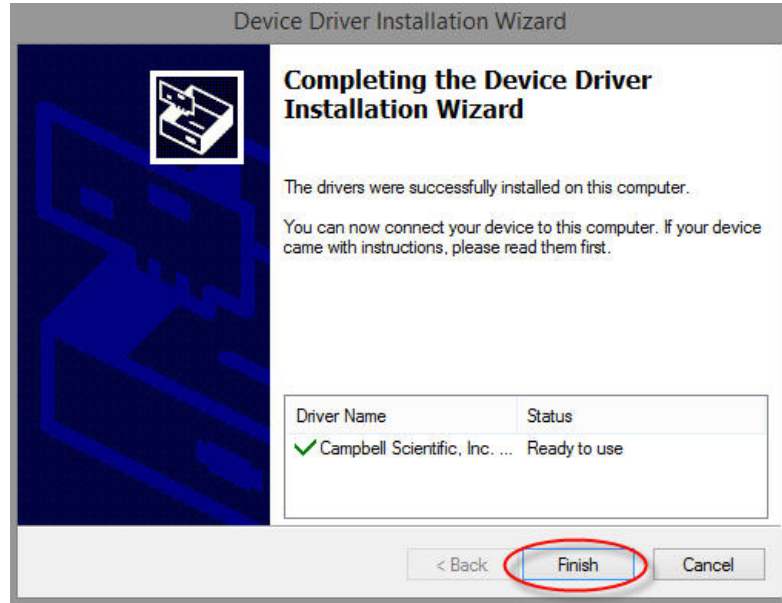
This wizard helps you install the software drivers that some computers devices need in order to work.

To continue, click Next.

< Back
**Next >**
Cancel

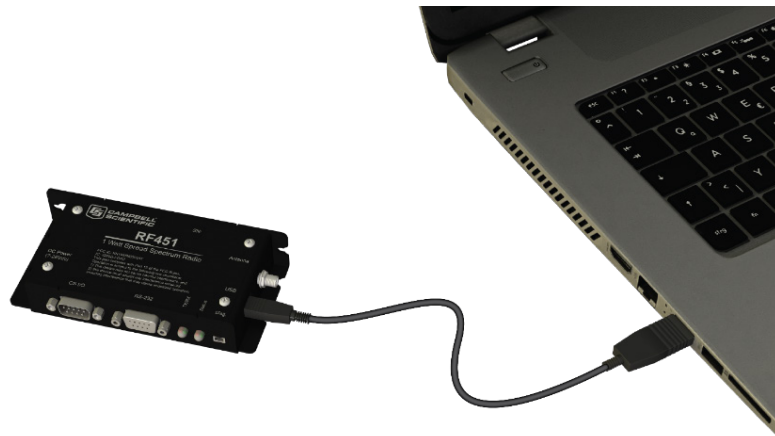
Click **Finish**.

The *Device Driver Installation Wizard* closes.



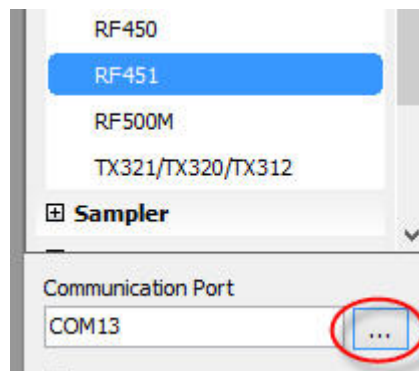
Connect the **USB** port on your RF451 to a USB port on your computer.

The RF451 **Status** LED blinks orange.



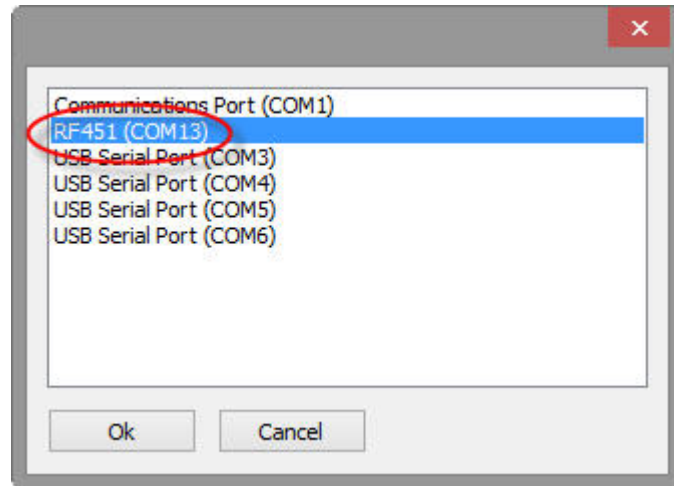
In the lower left of the *DevConfig* screen, click the **Communication Port** list button.

A list of available communication ports appears.



In the list of available communication ports, click **RF451 (COMnn)**, where **nn** is the COM port number assigned by your PC, then click **OK**.

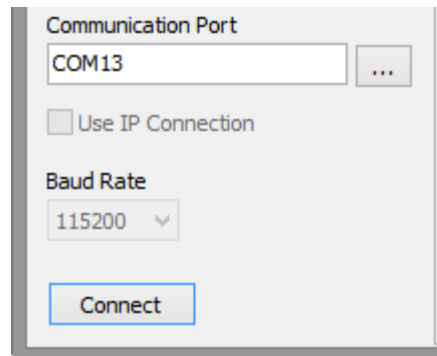
The COM port number assigned to the RF451 populates the **Communication Port** box.



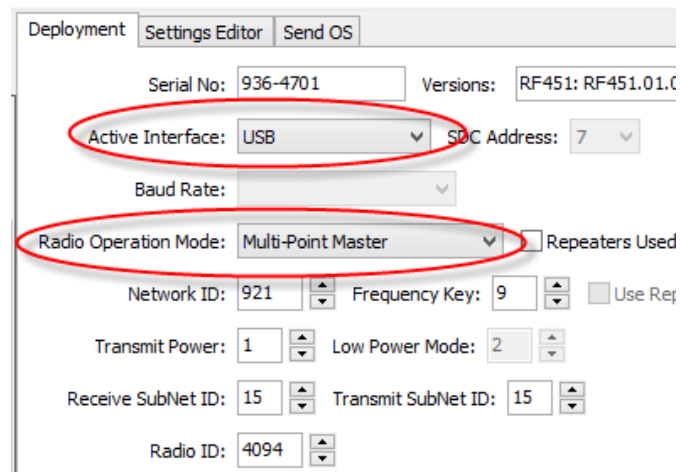
In the lower left of the *DevConfig* screen, click **Connect**. Click the extra **OK** if it appears.

*DevConfig* displays the **Deployment** tab in the right pane.

The RF451 **Status** LED goes to solid orange.



In the **Deployment** tab, set the **Active Interface** to **USB** or **RS-232** depending on how your computer will be connected to the RF451. Also, set the **Radio Operation Mode** to **Multi-Point Master**.



Click **Apply**.

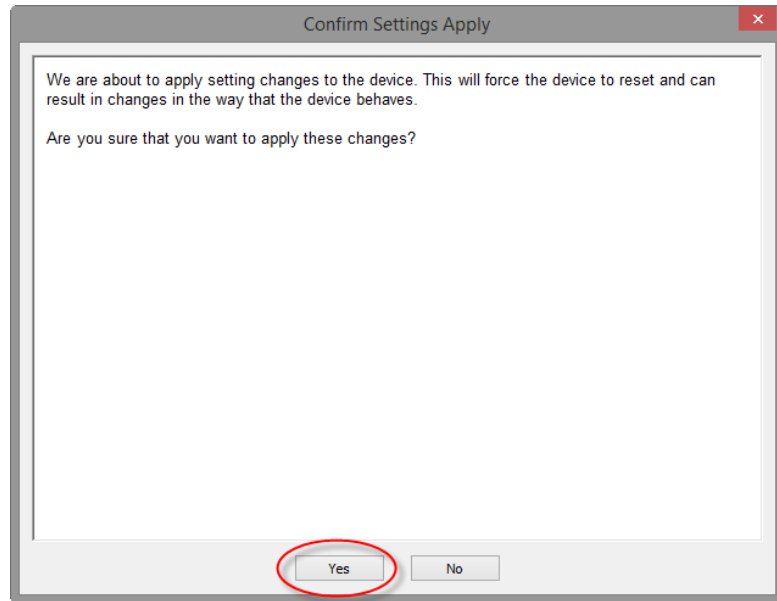
The **Confirm Settings Apply** dialog box appears.



In the **Confirm Settings Apply** dialog box, click **Yes**.

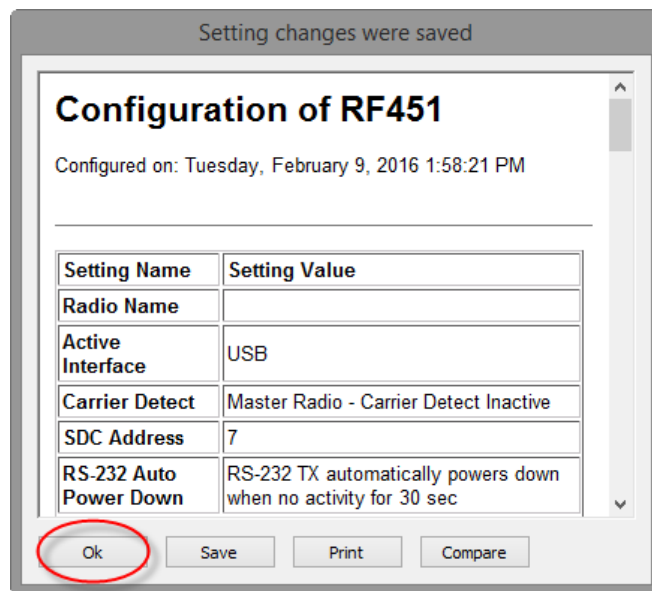
The **Settings changes were saved** dialog box appears.

The RF451 **Status** LED returns to blinking orange.



In the **Settings changes were saved** dialog box, click **OK**.

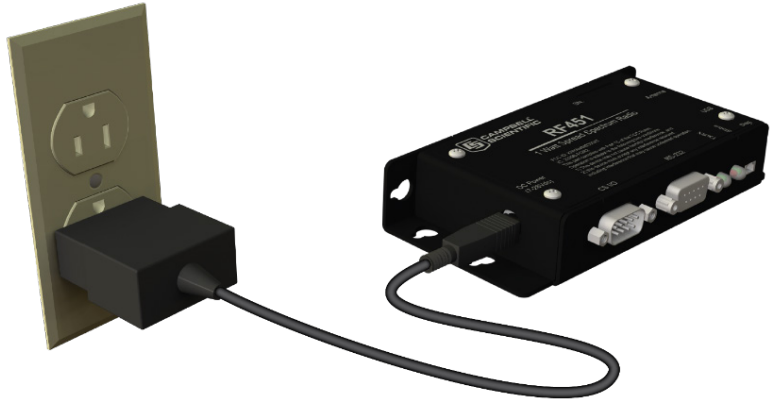
*DevConfig* disconnects from the RF451 and returns to the main RF451 screen.



Attach antenna to the RF451.



Provide power to the RF451. (The USB port can only supply power for configuration.)

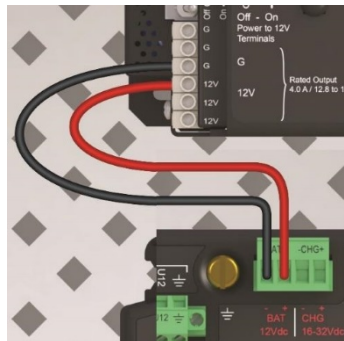


Attach antenna to the CR6-RF451.



Provide power to the CR6-RF451:

- connect 12 Vdc at the green **-BAT+** terminals,
- or connect 16 to 32 Vdc at the **-CHG+** terminals.



Click the *LoggerNet* icon on the PC.

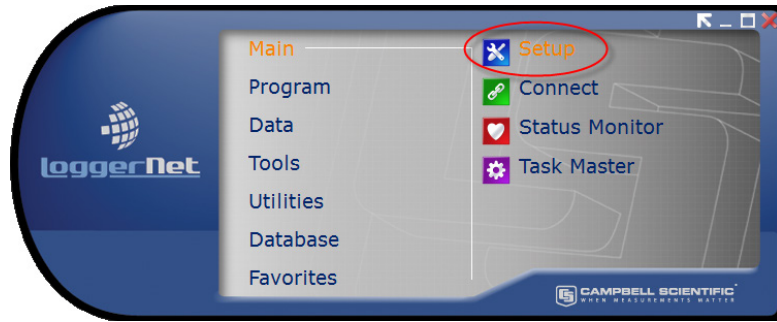
*LoggerNet* opens.



From the *LoggerNet* toolbar, select **Setup** from the **Main** category.

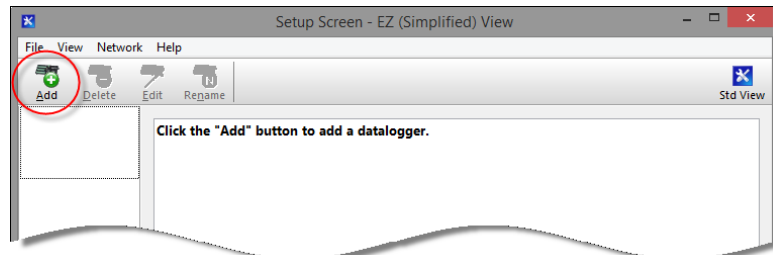
*LoggerNet Setup* screen opens.

If the *Setup* screen does not say **EZ (Simplified) View** at the top, click **EZ View** in the top-right corner, to switch to the EZ View.

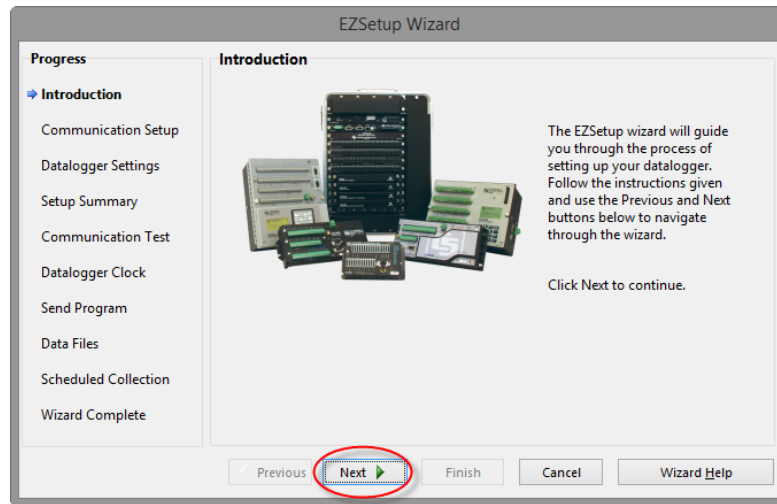


Click **Add**.

The *EZSetup Wizard* opens.

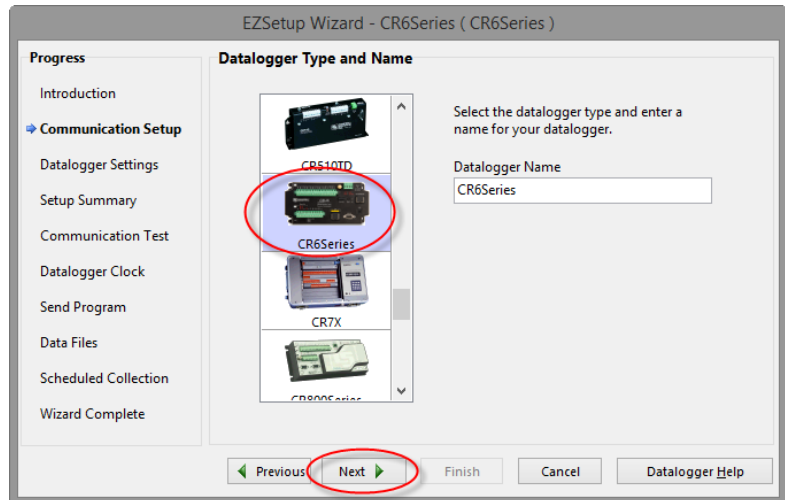


Click **Next**.

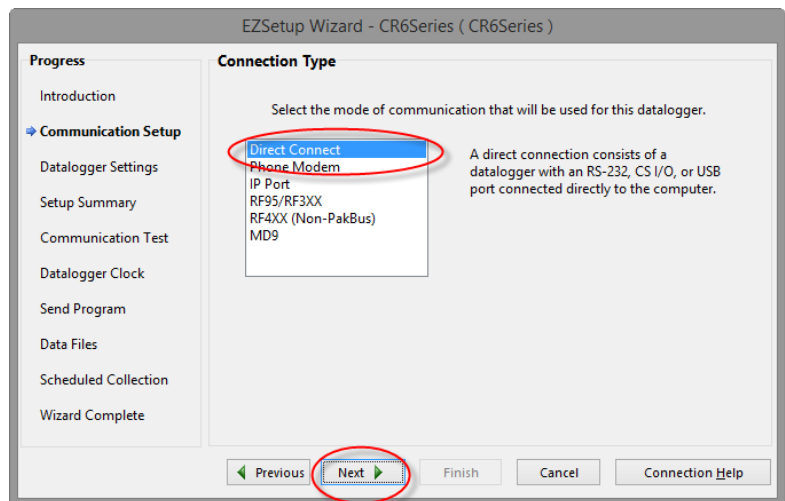




Select **CR6Series**. Click **Next**.

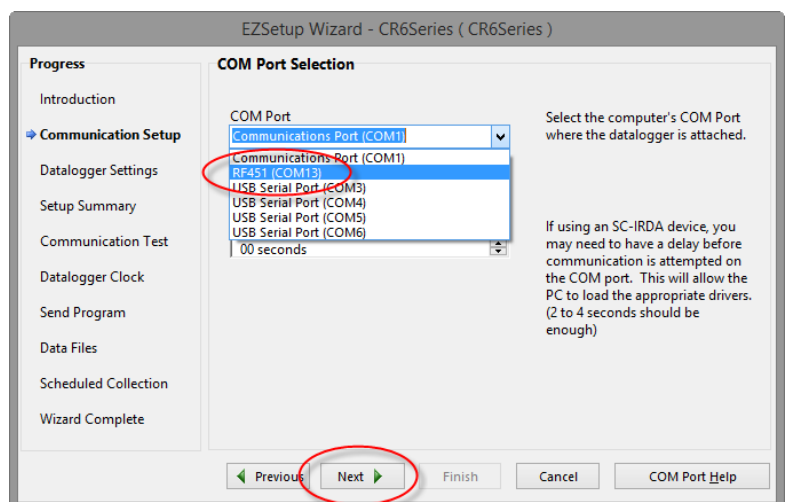


Select **Direct Connect**. Click **Next**.

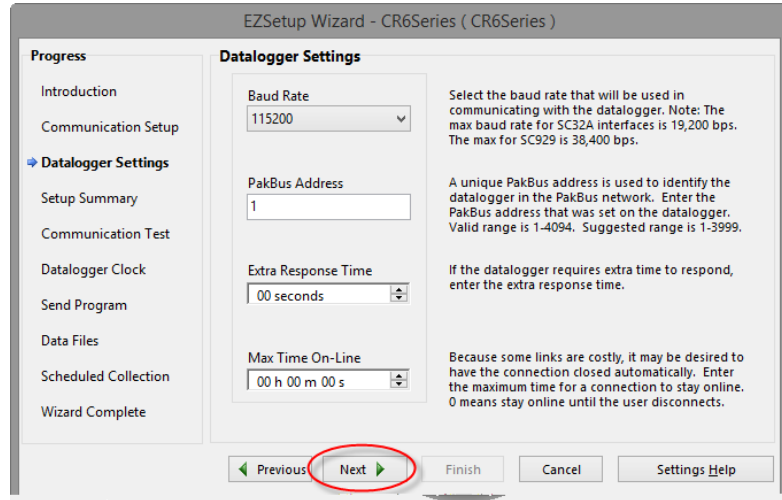


In the list of available communication ports, click **RF451 (COMnn)**, where **nn** is the COM port number assigned by your PC, then click **Next**.

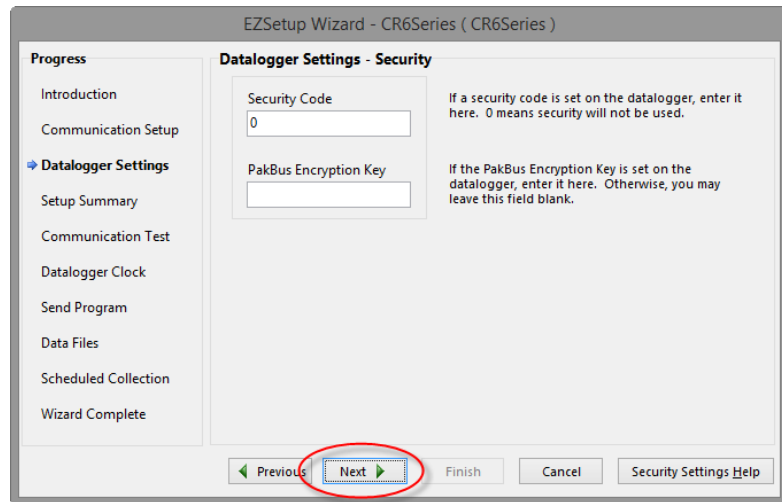
(Note that you choose **RF451 (COMnn)** to select the USB port to which the RF451 is attached. *LoggerNet* sees the CR6-RF451 as directly connected to this port. The RF451 to CR6-RF451 link does not need to be indicated in *LoggerNet*.)



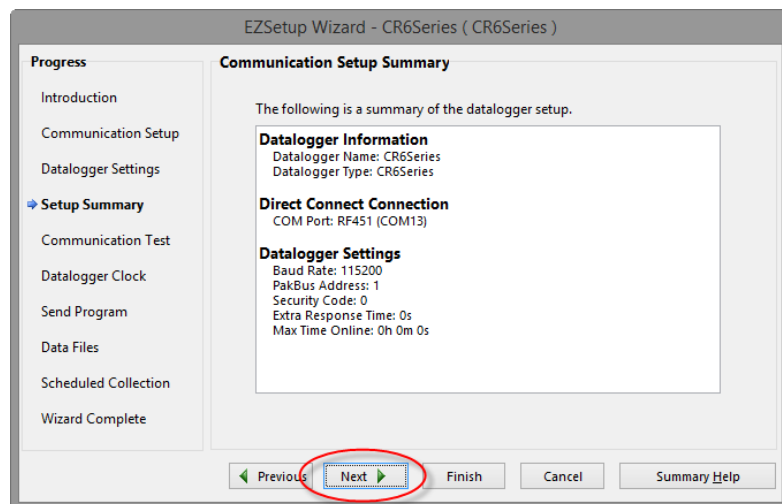
Enter the PakBus address of your datalogger. The default address is 1. Keep all other defaults. Click **Next**.



Leave these settings at their default values. Click **Next**.

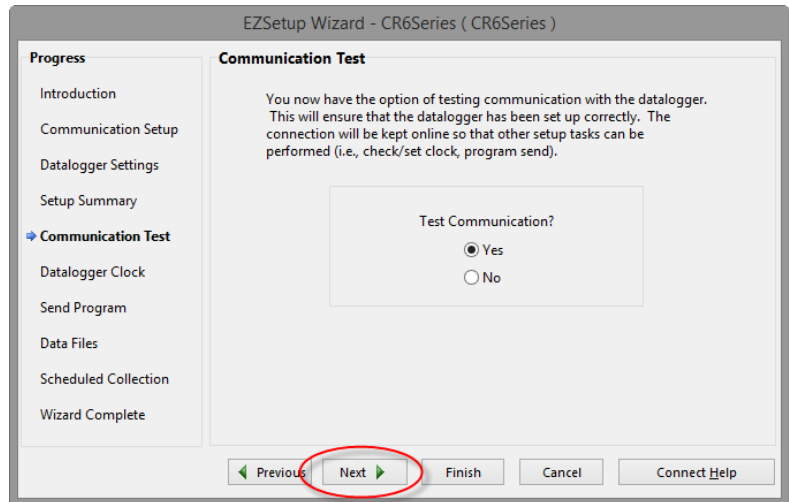


This screen shows a summary of the settings that you entered. Click **Next**.

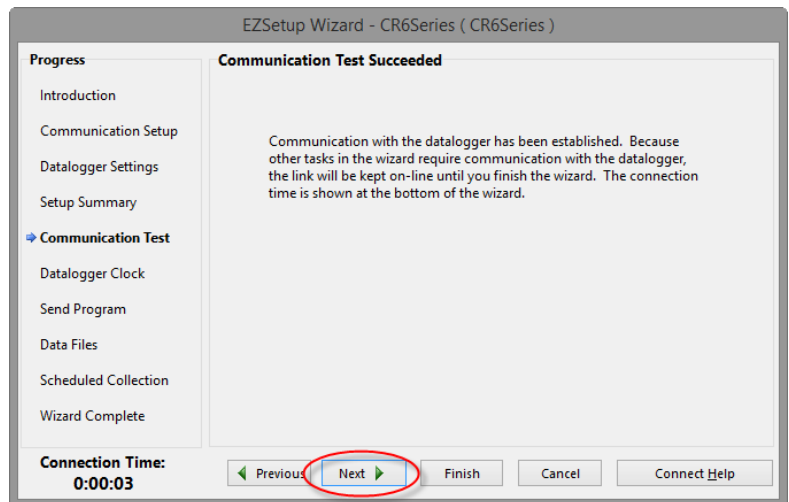


Click **Next**.

*LoggerNet* attempts to communicate with the CR6 and, if successful, the *EZSetup Wizard* advances to the **Communication Test Succeeded** screen. (If communication is unsuccessful, click **Previous** and verify all of the settings are correct.)

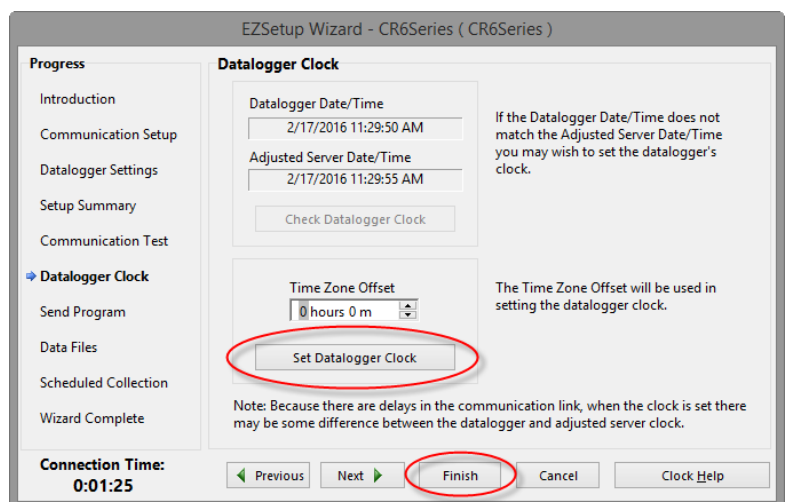


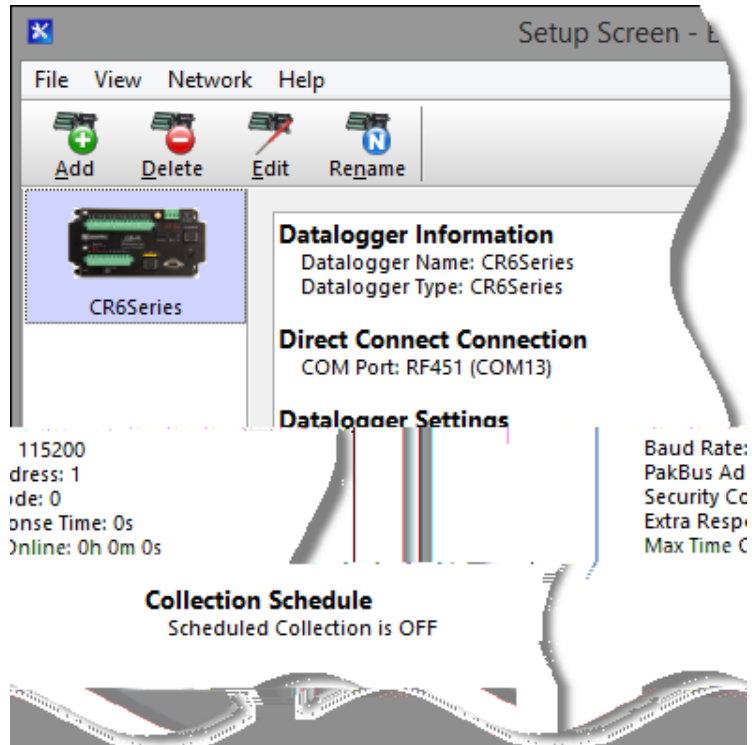
Click **Next**.



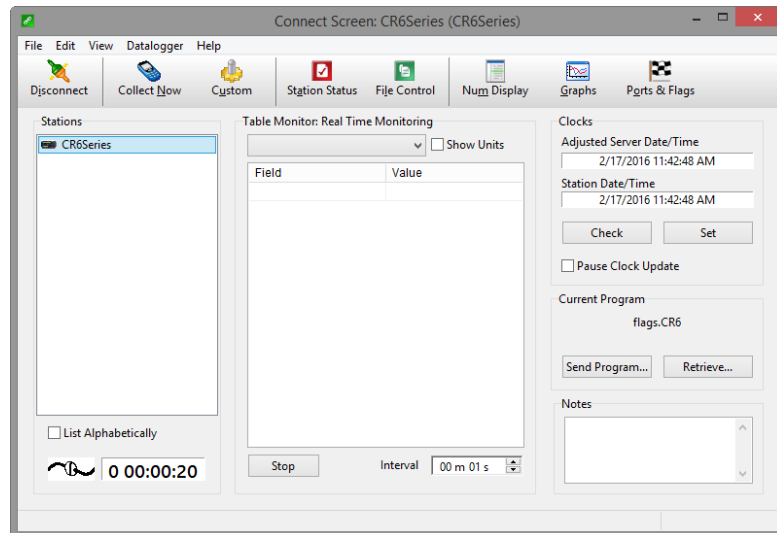
Click **Set Datalogger Clock**, and then click **Finish**.

The datalogger clock is then set to the PC clock, the *EZSetup Wizard* closes, and the CR6 is added to the *Setup* screen.



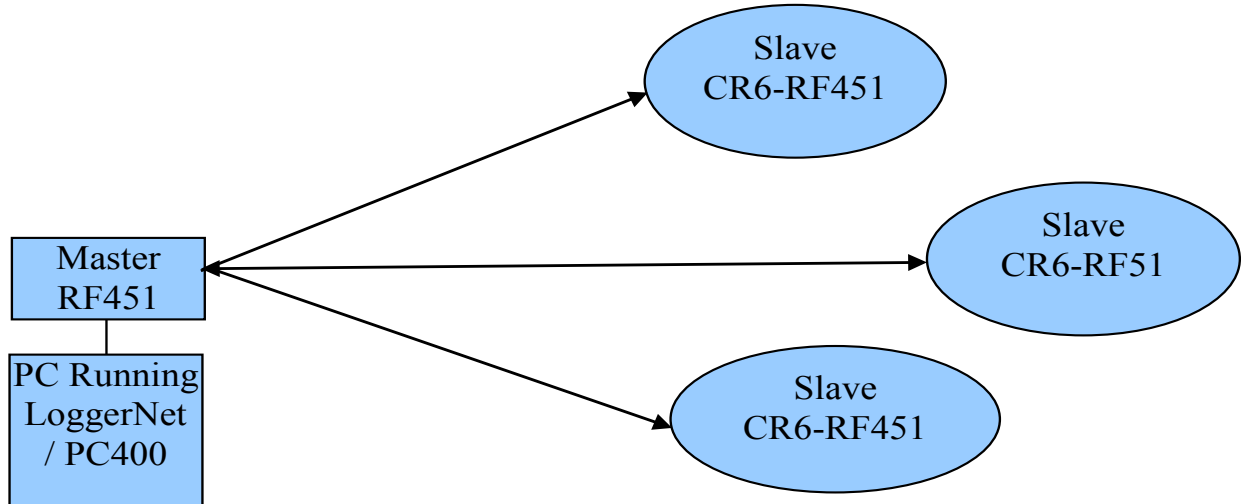


Use *LoggerNet Connect* to connect to the datalogger, send programs, and view and collect data.

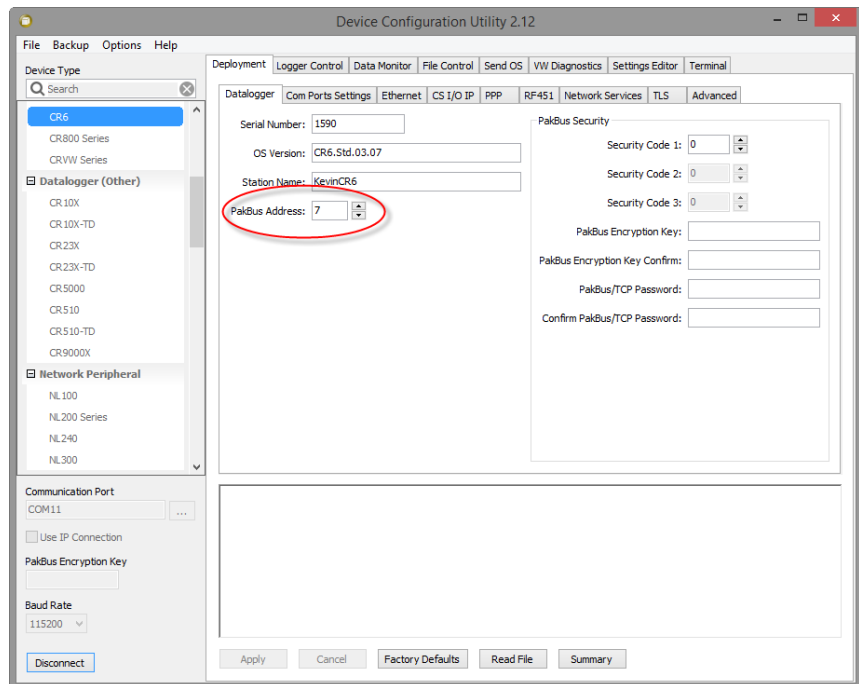


## 2.2 PC with RF451 to Multiple CR6-RF451s

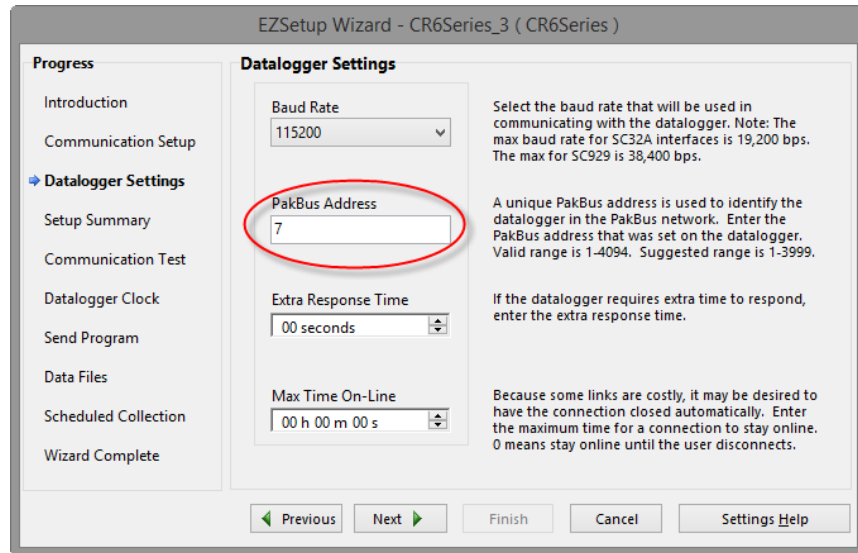
The Basic Procedure can be extended to include multiple slave CR6-RF451s in the system.



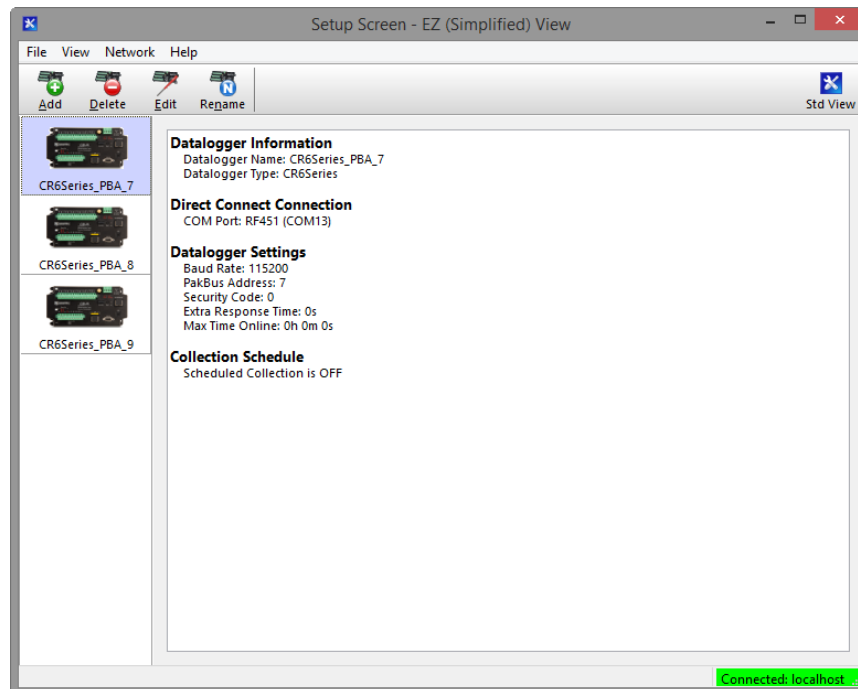
With multiple CR6-RF451s, *DevConfig* must be used to give each **CR6-RF451** a unique **PakBus Address**. This changes the hardware setting in the CR6-RF451.



These unique PakBus® addresses must be entered on the **Datalogger Settings** tab of the *EZSetup Wizard*. This change is to make the software settings (*LoggerNet*) match the change we made in the hardware settings using *DevConfig*.

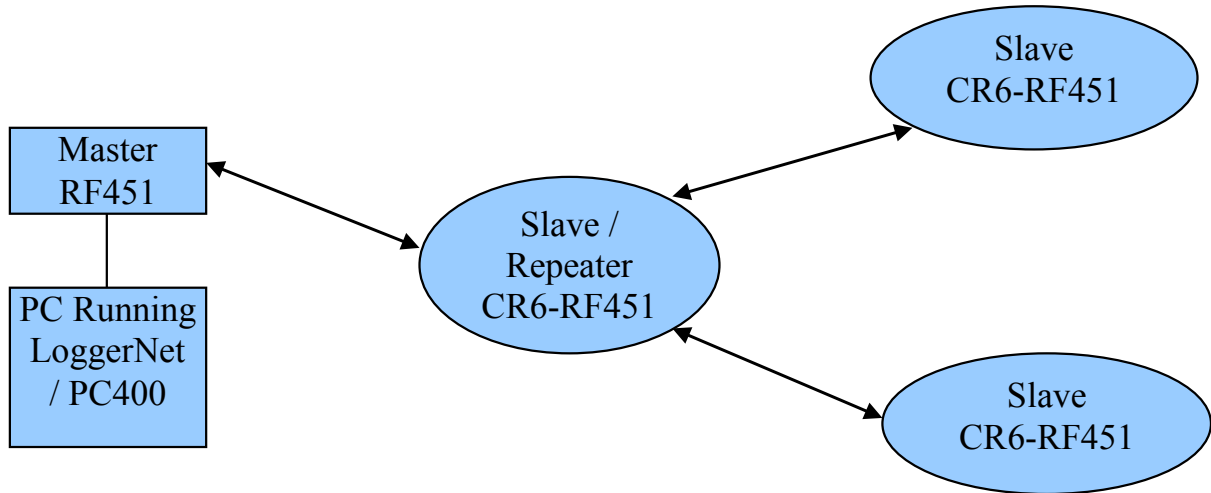


Once you have used the *EZSetup Wizard* to add all of the dataloggers in your network, they will all appear on the *Setup* screen.



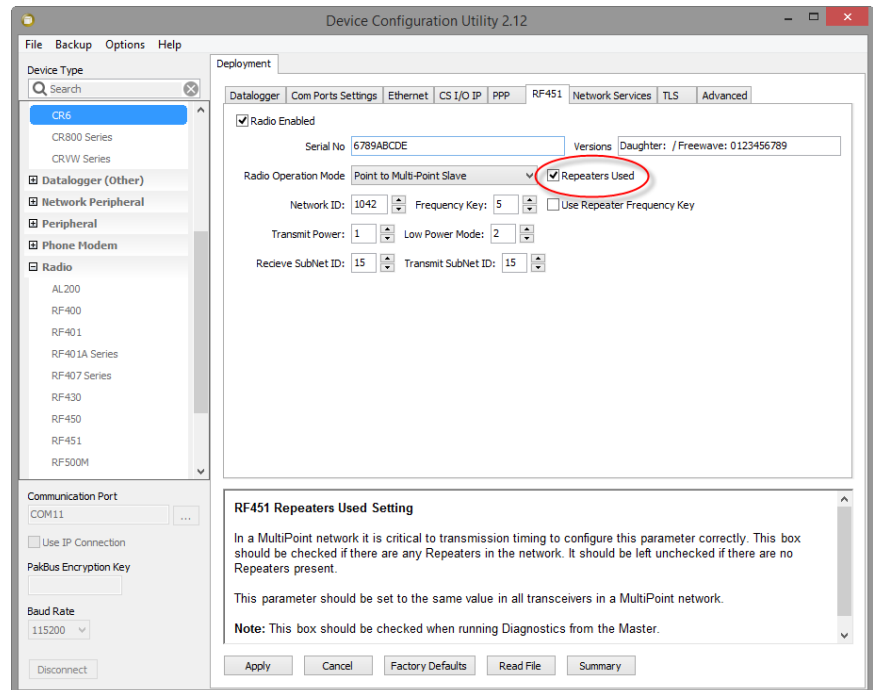
## 2.3 CR6-RF451 as a Repeater

The previous procedure can be extended to use one CR6-RF451 as a repeater in the network to go around an obstacle such as a hill.

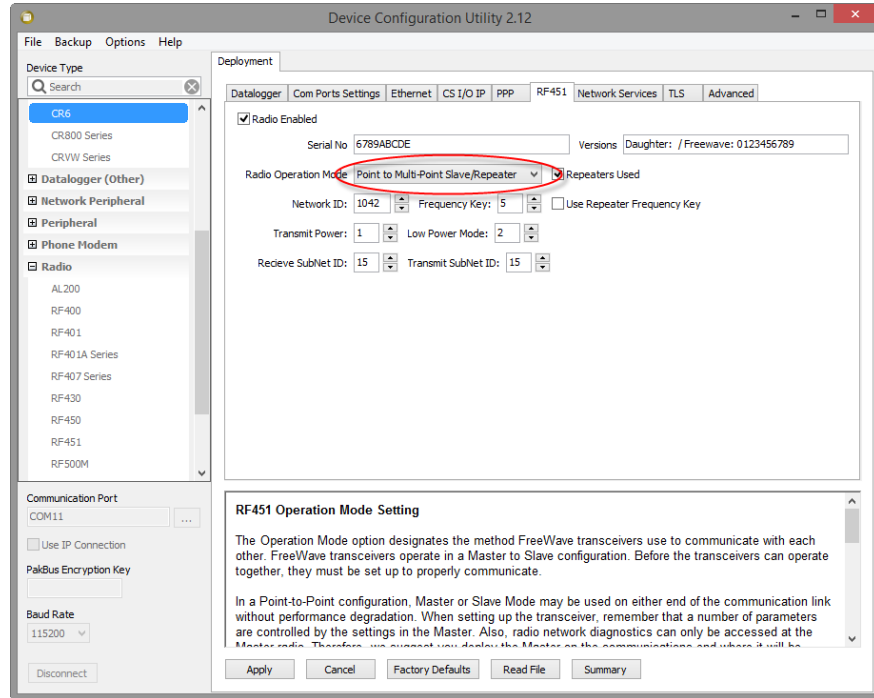


This requires only two changes to the previous procedure.

First, use *DevConfig* to enable the **Repeaters Used** checkbox in the RF451 and each CR6-RF451. (To see these settings when connected to a CR6-RF451, you must select the **RF451** tab at the top of the screen.)

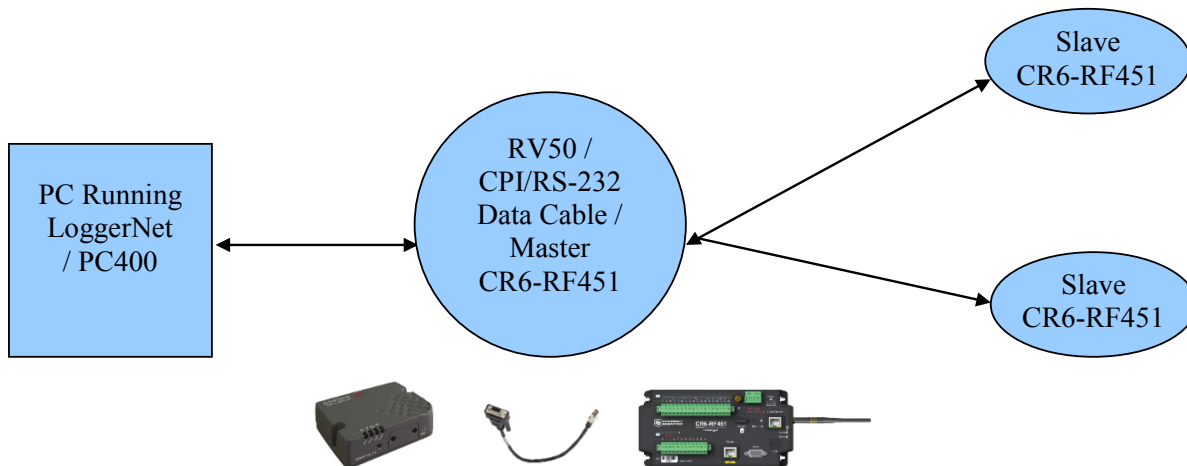


Second, set the **Radio Operation Mode** to **Point to Multi-Point Slave/Repeater** in the CR6-RF451 that will act as a repeater.



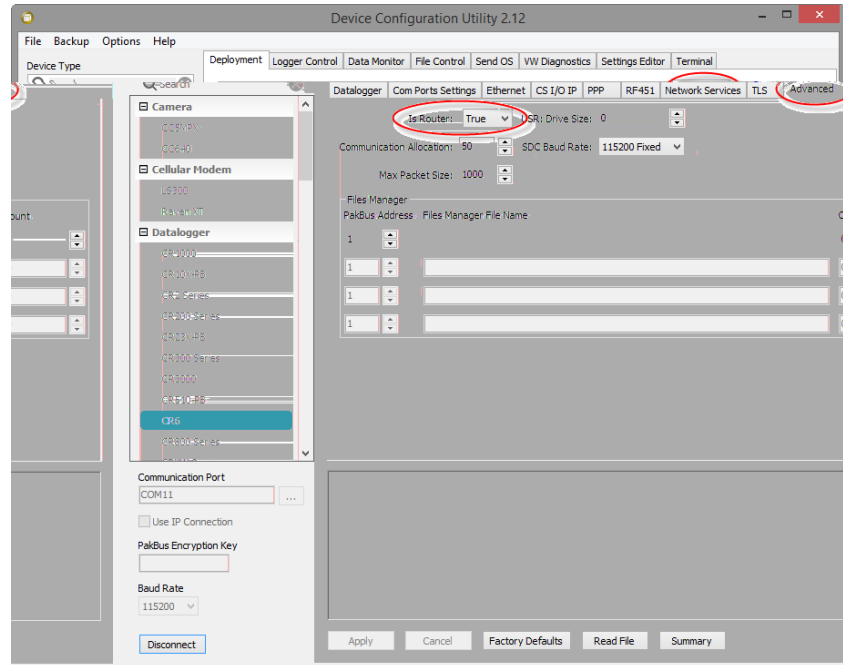
## 2.4 Communication Combinations

The CR6-RF451 can be used in a system with multiple communication methods. For example, in the figure below, the master CR6-RF451 communicates with *LoggerNet* through an RV50 cellular modem connected to the CR6-RF451 using a CPI/RS-232 Data Cable. (An Ethernet connection could also be used between the RV50 and the CR6-RF451. See the RV50 manual for more information.) The master CR6-RF451 communicates with the slave CR6-RF451s through RF.





This network only requires a few changes to the hardware settings described in the Basic Procedure (Section 2.1, *Basic Procedure: PC with RF451 to CR6-RF451* (p. 2)). The master RF451 has been replaced by a CR6-RF451, but *DevConfig* should still be used to set its **Radio Operation Mode** to **Multi-Point Master** as described in the procedure. In addition, the master CR6-RF451 must be made into a router. This is done from the **Advanced** tab in *DevConfig*. Set the **Is Router** setting to **True**.

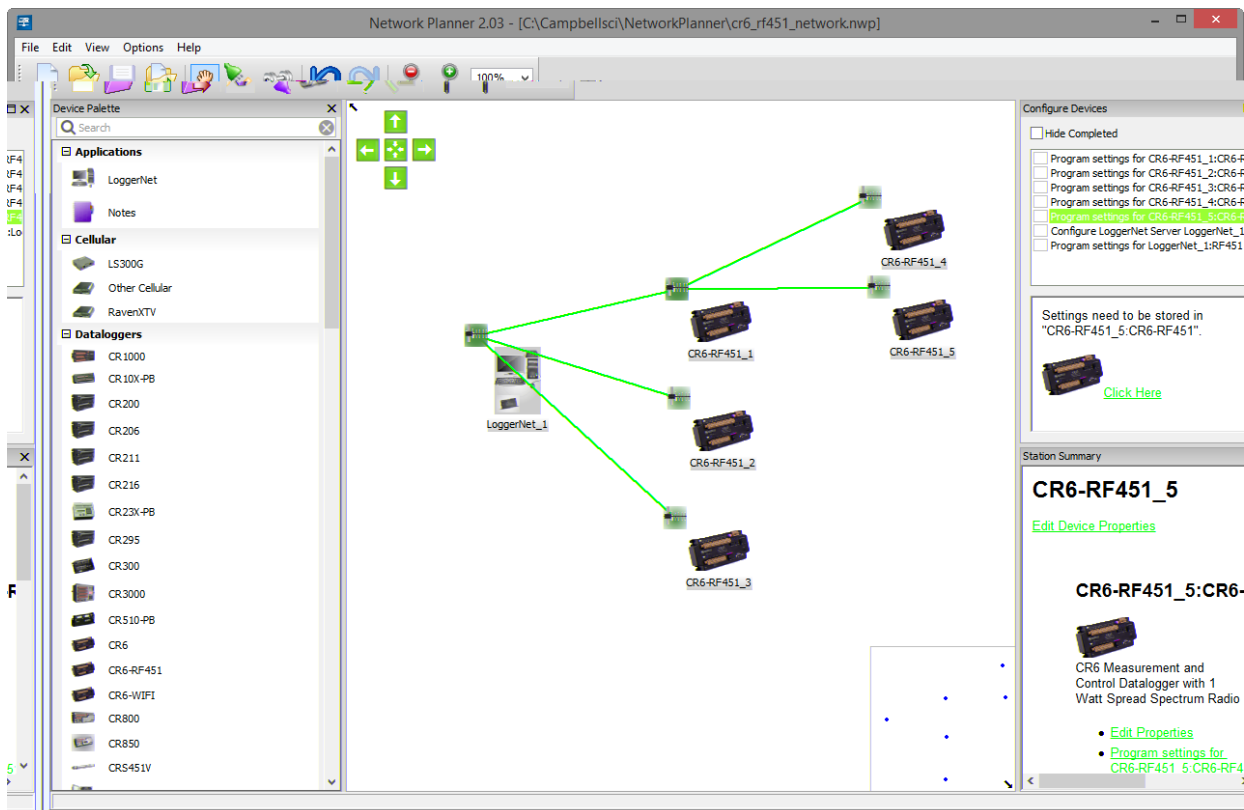


See the manual for the communication product being used in combination with the CR6-RF451 (in this example, the RV50) for information on setting up *LoggerNet* to communicate with the master CR6-RF451.

## 2.5 Network Planner



For more complicated networks, the *LoggerNet Network Planner* is recommended for the network setup. Select devices from the **Device Palette** and place them on the drawing canvas. Use the link tool to draw lines indicating the communication links between devices. Use the activity tool to indicate activities that will take place between devices.

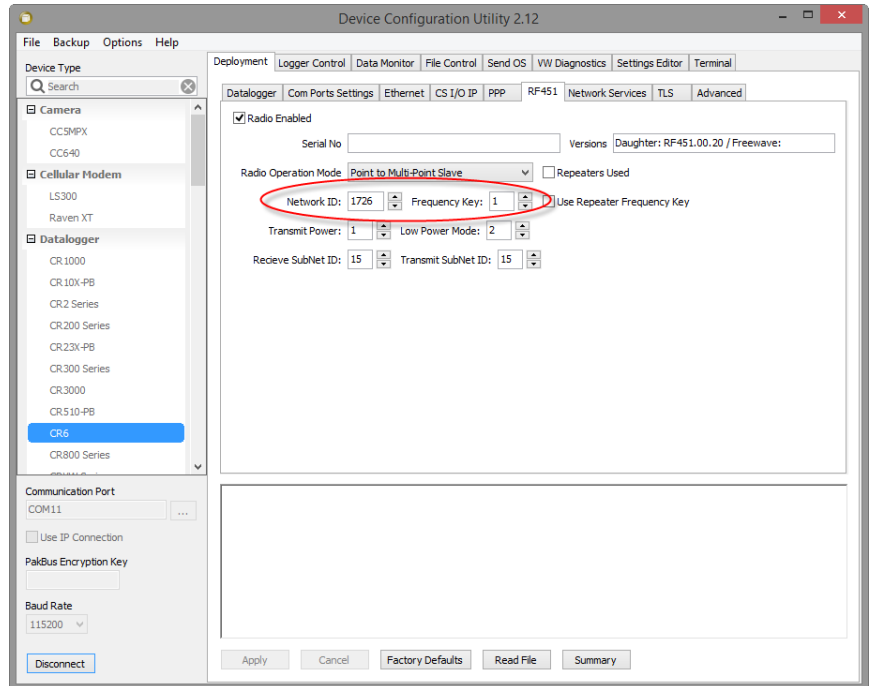


*Network Planner* calculates the optimum settings for each device in the network and allows you to send these settings to the device. If any change is made to a device in the network, that change is propagated to every affected device setting. *Network Planner* can then use the information entered to configure *LoggerNet Setup*.

Refer to the *Network Planner* help for more information.

### 3. Troubleshooting

If there are intermittent communication problems with the above setups, there may be another FreeWave® network in the area causing interference. To remove the interference, use *DevConfig* to change the **Network ID** and **Frequency Key** in all RF451s and CR6-RF451s to a different value. Each of these settings must have the same value in all RF451s and CR6-RF451s. For example, the **Network ID** in all devices could be set to **1726**, and the **Frequency Key** in all devices could be set to **1**. This is just an example. The **Network ID** can be any number between 0 and 4095, excluding 255. The **Frequency Key** can be any number between 0 and 14.







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